that, to the extent practicable, they seek out locations "where the surrounding terrain and existing frequency usage are such as to minimize the possibility of harmful interference" to terrestrial stations.[22] The FWCC grumbles that earth station deployment in the 4 GHz band has made that spectrum unavailable for terrestrial growth,[23] but the fact is that there was a substantial base of terrestrial links in that band before satellite services were ever authorized. The earth stations that have been deployed in the band have had to be placed at locations that avoided interference from the terrestrial stations that were already present.

Even once the spectrum was made available for satellite services, terrestrial systems had a distinct edge. Building out a terrestrial network is easier and faster than implementing new satellite services. The long lead times that are inherent in the satellite business give terrestrial systems a clear advantage under current policies.

Furthermore, despite the FWCC's complaints of spectrum shortages, a number of allocations for new terrestrial services both domestically and abroad have failed to attract significant interest from applicants or have resulted in default of auction pledges. Despite these failures, the Commission recently reallocated the 3650-3700 MHz band from fixed-satellite service to terrestrial fixed service usage,

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Establishment of Domestic Communication-Satellite Facilities by Non-governmental Entities, 18 RR2d 1631, 1634 (1970).

[22] 47 C.F.R. § 25.203(a). Many teleports are located at sites that have terrain shielding.

[23] Reply Comments of FWCC at 9 n.23.

over the strong objections of current and prospective satellite users of the band.[24] In short, there is no truth to the FWCC's suggestion that Commission spectrum policies overall favor satellite services at the expense of terrestrial operations.

The *Notice* itself implicitly acknowledges the lack of evidence in support of alteration in the current rules. The *Notice* specifically requests comment on the nature and extent of any coordination difficulties experienced in spectrum shared between satellite and terrestrial services. *See Notice* at ¶¶ 7, 30. There is no explanation, however, as to why the Commission moved to propose rules before developing a record as to whether a problem even exists.

On balance, the Commission must conclude that there is simply no factual basis for pursuing a change in policies here. As a result, the current rules should be retained.

D. The Commission Should Not Adopt Rules That Could Substantially Undermine the Viability of Next-Generation Broadband Satellite Systems

As discussed above, the Commission's current earth station licensing and coordination policies afford the flexibility necessary for the efficient provision of a wide range of satellite services, and the record contains no evidence that these important policies disadvantage terrestrial operators in any way. Thus, there is no reason to alter the Commission's rules in a manner that would severely disadvantage existing satellite operations. Furthermore, the drastic changes

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[24] *See Amendment of the Commission's Rules With Regard to the 3650-3700 MHz Government Transfer Band, First Report and Order and Second Notice of Proposed Rulemaking*, FCC 00-363 (rel. Oct. 24, 2000).

currently under consideration could substantially undermine the viability of next-generation broadband satellite systems.

As a consequence of the first Ka-band processing round, the Commission has already licensed nearly a dozen next-generation FSS systems to provide advanced broadband services in Ka-band frequencies. The Commission is also preparing to almost double that number of licensed systems as the second Ka-band processing round is drawing to a close. As the Commission stated in its order adopting Ka-band satellite service rules:

> The satellite systems that will operate in this band represent a new age in satellite communications. These systems have the potential to provide a wide variety of broadband interactive digital services in the United States and around the world including: voice, data, and video; videoconferencing; facsimile; computer access and telemedicine. The systems can provide direct-to-home services, potentially allowing customers to participate in activities from distance learning to interactive home shopping.
>
> The commercialization of the Ka-band spectrum will give rise to a dynamic new satellite market, potentially stimulating significant economic growth both in the United States and abroad. These systems also represent an opportunity for the United States to continue its leadership role in promoting global development through enhanced communication infrastructures and services. They also represent a major step in achieving a seamless information infrastructure.[25]

In addition to these Ka-band systems, V-band satellite systems will provide similar public interest benefits for consumers in the United States and around the globe.

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[25] *Rulemaking to Amend Parts 1, 2, 21, and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Frequency Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Service, Third Report and Order*, 12 FCC Rcd 22310 (1997).

The Ka-band systems authorized by the Commission are currently being implemented. These systems represent multi-billion dollar commitments to the global information infrastructure, and will provide additional capacity and new services required to meet the needs of the digital telecommunications marketplace. However, in order to participate in the emerging market for broadband satellite services and to compete effectively in the rapidly changing telecommunications environment, Ka-band and other new satellite systems require, among other things, the operational flexibility inherent in the Commission's existing earth station licensing and coordination rules.

Ka-band GSO FSS systems already face significant challenges in operating in bands shared with the terrestrial fixed service. In the 18 GHz band plan, the Commission designated the 18.3-18.58 GHz band to FS and GSO FSS on a co-primary basis; and designated the 18.58-18.8 GHz band to GSO FSS on a sole primary basis, grandfathering existing fixed service operations in that band for a period of ten years.[26] Thus, terrestrial operators will have had unfettered access to the 18.3-18.58 GHz band for many years before Ka-band GSO FSS systems even begin to use these frequencies, and Ka-Band GSO FSS systems are required to accept the burden associated with the multi-year "head start" enjoyed by terrestrial services in the deployment of their systems. Even in the sole primary GSO FSS

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[26] Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, and the Allocation of Additional Spectrum in the 17.3-17.8 GHz and 24.75-25.25 GHz Frequency Bands for Broadcast Satellite-Service Use, *Report and Order*, 15 FCC Rcd 13430(2000).

spectrum in the 18.58-18.8 GHz band, Ka-band systems must either accept interference from existing FS operations for ten years or incur significant expense in relocating grandfathered FS systems.

In view of the substantial challenges facing nascent Ka-band GSO FSS systems, and the advantages already enjoyed by the incumbent terrestrial services in sharing the 18 GHz spectrum, it is inconceivable that the Commission would even consider further handicapping Ka-band systems before they get off the ground by altering its earth station licensing and coordination rules in a manner adverse to satellite operations. Such an action would significantly hinder the ability of next-generation Ka-band systems to provide advanced broadband services to U.S. consumers, including those in rural and underserved areas, which plainly would be contrary to the public interest. Accordingly, the Commission should reject any notion of applying any changes in its earth station rules to satellite systems operating at Ka-band and higher frequencies.

II. THE PROPOSED USE DEMONSTRATION REQUIREMENT IS IMPRACTICAL AND WOULD UNREASONABLY BURDEN SATELLITE SERVICES

The *Notice* proposes to require an earth station operator to justify denial of coordination for a proposed new or modified terrestrial link by demonstrating past, present, or imminent future use of the frequency in question. However, as discussed below, the framework proposed by the Commission would be extremely cumbersome to apply, would require disclosure of competitively sensitive information, and would involve frequency coordinators in making determinations

for which they are ill prepared. Accordingly, the Commission should reject the proposal.

A. Making a Fair Determination of Earth Station Use Requires Consideration of a Broad Range of Complex Factors

Developing objective standards for evaluating use that would fairly take into account the range of factors involved in earth station operations would be extremely difficult, if not impossible. Although the *Notice* proposes to adopt a new rule that would require an earth station to demonstrate its use of a particular frequency channel in support of denying a coordination, the Commission states that it is deferring adoption of a definition of use. *Notice* at ¶ 49. Instead, the *Notice* simply sets forth a list of questions regarding how use should be determined without attempting to answer them. *Id.* at ¶ 54. The questions themselves, however, highlight the complexity of attempting to fairly evaluate earth station use.

Specifically, the Commission asks about a number of factors that might be relevant to determining whether an earth station has satisfied a requirement that it demonstrate spectrum use. As discussed in more detail below, a fair determination of earth station use would need to take into account all the factors set forth by the Commission. The Commission has set itself an impossible task in proposing to develop a framework that would permit appropriate evaluation of all these elements.

Frequency Diversity: The Commission seeks comment on how the need for frequency diversity should be considered in making a usage determination. As the Coalition has made clear above, every earth station operator has a legitimate

interest in the availability of alternative frequencies. Some facilities, such as teleports, routinely use transponders on a variety of different satellites covering a whole range of frequencies. However, even when a given earth station relies primarily on a single satellite and uses a smaller subset of frequencies, any number of events can create the need to shift to use of a different transponder or satellite, with an accompanying change in frequency. As discussed above, such changes can be necessitated by requirements associated with coordination agreements with other satellite operators, the need to restore service in the event of a transponder or facility outage, an increase in demand for service to or from a particular location because of an emergency or news event, the launch of a replacement satellite with advanced features and a different frequency plan, or satellite relocation or other adjustments due to management of the overall satellite communications network. Furthermore, there is no way to predict in advance when one of these events will occur or what frequency any given user will need access to in response. As a result, frequency diversity is a valid requirement for every earth station operator and would have to be an acceptable explanation in support of a claim of imminent use of a given frequency channel.

Intermittent Use: The Commission asks about situations in which the earth station operator has used the spectrum at issue intermittently but not constantly. Again, there are many circumstances in which a frequency that is not used for primary service may be needed on an occasional basis in response to customer requirements or the need for redundant services. There is simply no basis

on which the Commission could set a minimum amount in minutes or a standard based on data throughput for wideband systems that would adequately reflect the wide range of system requirements. Any past use of a frequency – intermittent or not – would have to be considered sufficient to satisfy the necessary showing.

Transponder Usage: Similarly, the Commission asks how often a particular transponder or portion of a transponder should be required to be active to be considered in use. For the same reasons mentioned previously, there is no basis on which the Commission could determine that a particular amount of time should be set as the minimum in order for an earth station operator to protect its right to use frequencies on a transponder that is in occasional but not constant use.

Future Use: The *Notice* next inquires about standards for evaluating planned future use of a frequency in a range of situations, including circumstances in which a transponder cannot be brought into use immediately because of international coordination difficulties or is needed only for redundancy. Like the other factors, these are legitimate circumstances that would justify a showing of imminent use of a frequency. As we have discussed, the ability to use certain frequencies for specific services can be constrained by limitations due to coordination with adjacent satellites. Furthermore, protecting the availability of frequencies needed to provide redundancy in the event of an equipment failure is critical to efficient operation of satellite networks.

Space Segment Assignment: The Commission also asks if a use standard should take into account situations in which the frequency is assigned at

the sole discretion of the satellite operator. Again, the answer is clearly yes. Certain operators, notably INTELSAT, assume that a customer requesting capacity can use any available frequency within a given range.[27] In such circumstances, the inability to use the assigned frequency would cause loss of the capacity. Obviously in these instances the earth station operator must be permitted to protect its full access to spectrum.

Equipment Failure: Next, the Commission raises issues relating to the need for spectrum availability to plan for the possibility of transponder or satellite failure, uncertainty relating to use of a satellite nearing the end of its useful life, and other similar events. The Coalition has already addressed these matters in detail. The need to prepare for contingencies relating to potential equipment failures clearly must be accommodated by any usage standard.[28]

Balance of Current and Future: Finally, the Commission seeks input regarding how current and future use should be balanced in determining the

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[27] *See, e.g.*, Opposition of Sprint Corporation at 2-4; Reply and Opposition of MCI WorldCom, Inc. at 3.

[28] The FWCC, although acknowledging that earth stations communicating with satellites nearing their end of life need spectrum flexibility, objects to otherwise permitting earth stations to maintain access to spectrum that will be needed in the event of a facility malfunction. Specifically, the FWCC claims that it is inequitable to "short-chang[e] the fixed service in order to protect the FSS industry against the risk of failure of its own equipment." Reply Comments of FWCC at 13. Once again, however, the FWCC is ignoring basic differences between satellite and terrestrial operations. As we have explained, once a spacecraft is launched, there is no possibility of repairing a malfunctioning transponder. In contrast, if terrestrial equipment breaks, it can readily be repaired or replaced. Thus, the need for availability of protection frequencies for fixed satellite services reflects the realities of space-based operations, not unfair favoritism.

availability of spectrum in a coordination. For the reasons discussed above, both current and planned future use of spectrum are indispensable elements in the efficient management of a satellite network. Because customer requirements, equipment failures, frequency assignments, and other factors are highly unpredictable, earth station operators cannot make an advance showing regarding when a frequency might be brought into use or what frequency would be needed.

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Even the FWCC has agreed that these factors are legitimate and should be considered in evaluating a usage showing by an earth station operator.[29] The Coalition frankly does not see how the Commission can craft a framework that would fairly take into account these myriad factors to reach a determination of whether or not an earth station has made a satisfactory demonstration of use.

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[29] *See id.* at 12-13 (arguing that need for bandwidth, even when not currently used, can legitimately be demonstrated where:

- the satellite or frequency are wholly at the discretion of a space segment provider independent of the earth station operator;
- the earth station operator's business routinely requires ready access to multiple satellites;
- an earth station complex has multiple antennas pointing at multiple and changing satellites;
- an earth station operator provides service to independent third parties with unpredictable space segment needs;
- an earth station coordinates to use a satellite known to be nearing the end of its useful life; or
- an NGSO feeder link earth station requires access to the multiple satellites in a system.

Certainly there is no realistic prospect of doing so with "narrow, precise rules" that are "clear, straightforward, and enforceable."[30] The question of what constitutes use is simply not an issue that is susceptible to a straightforward answer because of the range and variety of circumstances involved.

B. Demonstrating Use Would Impose Significant Burdens on Earth Station Operators and Require Disclosure of Highly Sensitive Business Information

Even if the Commission could come up with an appropriate standard for use, demonstrating that the standard was met under the FWCC's proposal would be time consuming for operators and would require disclosure of competitively sensitive business data.

Any attempt to impose a new set of requirements based on a regulatory definition of use would exponentially increase the administrative burdens associated with coordination for earth station operators. Specifically, under the *Notice*'s proposals, each earth station would need to develop a database to document past, current, and planned future use of spectrum in order to be in a position to protect frequencies. Complying with the new showing required would be particularly burdensome for earth stations that routinely communicate with multiple satellites, including those that provide occasional use services. As a result, the proposal would impose unnecessary costs on operators that would have to be passed on to satellite service customers.

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30 *See Notice*, Separate Statement of Commissioner Harold Furchtgott-Roth at 1.

The proposal has other serious implications for operators. Information regarding past and present use is generally considered confidential by operators. This type of information is competitively sensitive because a rival could use it to target the operator's customers. In addition, the Commission suggests that claims of imminent future use might need to be supported by service contracts, which are also highly confidential.

The problem is compounded because the Commission proposes that in the first instance, usage information would be provided to the frequency coordinator. The Commission does not suggest any procedures for ensuring that the coordinator protects the confidentiality of this information. Today, even if a frequency coordinator has been retained by an earth station licensee to provide frequency protection, the coordinator does not normally receive confidential business information from the operator. Operators will be extremely reluctant to disclose such information to a frequency coordinator who routinely represents a wide range of competing licensees, both satellite and terrestrial. The Commission simply cannot expect that earth station operators will release competitively sensitive documents without any guarantee that their confidentiality will be maintained.

In the event of a dispute regarding the frequency coordinator's decision, the *Notice* proposes that any relevant information be supplied to the Commission for evaluation. The Commission asks whether the information received by the Commission should receive confidential treatment. *See Notice* at

¶ 53. Clearly, the answer is yes. Yet the Commission does not propose any concrete actions to ensure that sensitive business information is not disclosed.

There is simply no justification for adopting policies that would impose substantial new record-keeping responsibilities on earth station operators and require routine disclosure of highly confidential documents relating to earth station usage. For this reason alone, the proposal to require demonstration of use should be rejected.

C. The Proposed Rule Would Increase Burdens on Commission Personnel

The proposed rule change would also lead to a substantial increase in administrative burdens on the Commission staff. Under existing policies, the Commission relies on the parties to a coordination to exercise good faith in weighing technical and business issues relevant to the proposed new service. Because the Commission has not imposed any significant level of regulation on the process, the parties can resolve disputes without invoking Commission intervention.

The proposal for requiring an earth station to justify denial of coordination by demonstrating its use of the frequency at issue would change this situation dramatically. Specifically, the proposal would for the first time impose regulatory limitations on coordination issues, leading to questions regarding the proper interpretation of Commission standards and the legitimacy of decisions applying those standards in any individual case.

The stakes are high for both satellite and terrestrial operations. In areas where demand for spectrum is particularly intense, decisions that affect

access to that spectrum are likely to be contentious. As a result, it can be expected that frequently the party adversely affected by a frequency coordinator's decision will invoke Commission review. This is particularly true in light of the complexity of the factors that would bear on any determination of use, as discussed above. Thus, the proposed rule change, if adopted, would likely lead to a substantial influx of disputed cases regarding coordination issues that Commission staff would be called on to resolve. This would place an additional burden on the limited time and resources of the Commission.

Furthermore, even when a case does not lead to a challenge, Commission action will be necessary. As the *Notice* recognizes, any instance in which a terrestrial operator is granted access to a frequency over the earth station operator's initial objection will effectively result in modification of the earth station license. *See Notice* at ¶ 58. Specifically, if the earth station operator had been initially licensed for the full band, the effect of the decision will be to make the frequency to be used by the terrestrial operator unavailable to the earth station licensee in the future. Presumably, this change would need to be reflected in the Commission's licensing database. Simply having a record of the change kept by the frequency coordinator would lead to discrepancies between the licensing database and the information held by the frequency coordinator, increasing the possibility for disputes. The *Notice* does not sufficiently recognize or address these issues.

D. The Proposal Would Unreasonably Constrain the Flexibility of Satellite Service Operations

Even if these fundamental administrative and procedural hurdles could be overcome, the proposed rule should be rejected because it would severely limit satellite operations. As discussed above, flexibility to shift spectrum used is essential to efficient satellite system utilization of shared spectrum. The Coalition has explained in detail that access to diverse frequencies is needed to ensure that an earth station operator can restore service in the event of an outage, can utilize spectrum channels assigned by a space station operator, can adjust to the need for coordination among adjacent satellites, and can ensure the availability of frequencies in the event of a spike in demand due to an emergency or news event. Furthermore, it is impossible to predict in advance when a spectrum shift might be necessary or what frequency will be available for use at that time.

Despite the FWCC's protestations that it does not seek changes that would "impair earth station operators' legitimate needs for flexible spectrum use,"[31] the impact of this proposal would be to do exactly that. It would permit fixed service operators to chip away at available spectrum for an earth station operator, significantly increasing the likelihood that service restoration will be impossible in the event of a malfunction in the spacecraft primarily relied on by the earth station's customers. Reduction in access to spectrum will also interfere with network management and impair the operator's ability to respond to changes in demand for service. Especially in light of the absence of any concrete evidence that

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[31] Reply Comments of FWCC at 5.

the current system is actually harming terrestrial operators, the Commission should not adopt requirements that would so substantially limit the flexibility on which satellite networks rely.

E. Use Determinations Should Not Be Made by a Frequency Coordinator

The demonstrated use proposal is flawed because frequency coordinators are ill-prepared to evaluate usage demonstrations. As discussed above, any given determination regarding earth station use will involve a range of factors relating to the types of services provided, the need for redundancy, and the need to maintain efficient network management. The Commission has not yet even attempted to develop a framework – assuming for the purposes of argument that a framework could be developed – that would equitably reflect these requirements of earth station operations.

Frequency coordinators simply do not have the qualifications to interpret Commission policies or weigh the range of business and technical issues relevant to a usage evaluation. Essentially the Commission is asking a third party to perform an adjudicatory role in a situation in which the coordinator clearly lacks the necessary expertise. Furthermore, frequency coordinators, who typically represent clients in both the terrestrial and satellite industries, may have no interest in being put in a position where instead of facilitating coordination, their job is to choose winners and losers in a conflict over access to spectrum.

The *Notice* does not even attempt to justify delegating this responsibility to frequency coordinators, assuming the Commission even has the

authority to delegate this function. Earth station operators are entitled to have determinations that will affect their future access to spectrum made by qualified, unbiased decision-makers.

F. The Technical and Operational Characteristics of Ka-band and Higher Frequency Satellite Systems Preclude Application of Demonstrated Use Requirements

As described throughout these Comments, the Commission should not apply demonstrated use standards to FSS earth stations. Many, if not all, of the problems associated with such standards being applied at lower frequency bands also exist in higher frequency bands shared with the fixed service (*e.g.*, the 18.3-18.58 GHz band). Furthermore, the Ka-band FSS systems licensed by the Commission will employ advance satellite communications technologies that are significantly different from traditional C and Ku-band systems to provide on-demand, two-way broadband communications with a wide range of data rates that accommodate individual user requirements in real time.[32] The use of these advanced technical characteristics, as detailed below, provide additional reasons why it would be illogical to apply the proposed demonstrated use standards to the Ka-band and other higher frequency satellite systems.

For instance, Ka-band systems generally plan to utilize wideband 125 MHz to 500 MHz transponders to provide broadband services to consumers. In these broadband systems, packet communications techniques are used whereby

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[32] For instance, a user may require varying amounts of bandwidth on a day-to-day basis. This changing requirement can be met by Ka-band systems employing real-time dynamic resource allocation capabilities.

each earth station within a downlink beam receives the same wideband downlink signal. Once the wideband downlink transmission is received, each earth station retrieves the data packets specifically addressed to it.[33] Since the Commission's intent is to exploit known frequency usage to facilitate sharing with terrestrial services, and the wideband signal is always in use by earth stations within the satellite beam based on the demand of the particular users, it is not feasible to demonstrate earth station "use" for these types of systems as proposed by the Commission.

In order to further increase spectrum efficiency and satellite capacity, Ka-band satellite systems are also being constructed with antenna spot beam technologies that maximize frequency re-use. Depending on the frequency re-use plan employed, each spot beam will generally employ a single wideband channel (*e.g.*, 250 or 500 MHz channel) and polarization at the initiation of service. Given the number of Ka-band networks to be deployed and the variation in the beam coverage patterns of each system, it is expected that the wideband channels of the different satellite networks will use the full 500 MHz of 18 GHz spectrum in the same geographic area. Moreover, many Ka-band systems plan to co-locate multiple satellites at the same orbit location in order to maximize system capacity through the use of all of the wideband channels (available frequencies) in each spot beam. It is clear from the above that earth stations within the geographical area covered by

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[33] This stands in stark contrast to the typical FDM access architecture used at lower frequency bands where a single earth station can receive a variety of specified, relatively narrower bandwidth signals over time.

these satellites will need to be capable of receiving data from any satellite across the 500 MHz of 18 GHz spectrum. In view of the foregoing, it is likely that the entire 18.3-18.8 GHz band will be used by earth stations of many Ka-band GSO FSS systems at all times in a given geographic area.

The above paragraphs describe some of the fundamental aspects of the technologies that will be employed by Ka-band and higher frequency satellite systems. These clearly provide reason enough why the contemplated notion of demonstrated earth station use is not appropriate for satellite systems that operate at higher frequencies such as Ka-band and V-band. However, there are other differences between transmissions in the C/Ku-band versus Ka/V-band that preclude the application of demonstrated use standards for reasons beyond those that militate against demonstrated use in the lower frequency bands.

For instance, higher frequency satellite systems will suffer greater propagation losses than systems operating at lower frequencies. In order to compensate for the greater rain attenuation, systems operating at higher-frequencies may use earth station site diversity when very high reliabilities are required by the system or its users

With earth station site diversity, earth stations are deployed at a certain minimum separation distance with both earth stations simultaneously receiving the same satellite downlink signal. As heavy rain occurs, the diverse site is engineered such that it is highly probable that the rain event will not affect both earth stations at the same time. At any given time, the earth station site with the

most reliable signal will be used. Thus, the two earth stations will not simultaneously use the spectrum. In this case, the frequencies used by each earth station must be fully protected from terrestrial services at each site all the time, even though the receive signal from only one earth station is actually being used at any given time.

Furthermore, in certain of the Ka-band systems, it is planned to use a full 500 MHz (18.3-18.8 GHz) in many spot beams from the commencement of service. In addition, some systems intend to implement steerable beams, which are capable of serving any portion of the Earth visible to the satellite above a certain elevation angle. In this case, each earth station needs to be capable of receiving data on any of the authorized Ka-band frequencies of that network. This provides maximum flexibility in the operation of the network resulting in most efficient use of the limited resources available. Again, as Ka-band systems plan to use their entire authorized bandwidth in each beam, consideration of applying a demonstrated use standard does not make sense, and would needlessly impose regulatory burdens on the satellite systems with no promise of additional spectrum for the fixed services at a given site.

For the reasons given above, it is clear that the Commission's proposed demonstration of use standard is inappropriate for higher frequency systems.

G. Any Proposal for a Spectrum Efficiency Standard for Earth Stations Would Be Unworkable

The *Notice* does not propose a specific efficiency standard for spectrum use by earth stations, but seeks comment as to whether the Commission should attempt to develop one. The Coalition strongly urges the Commission not to engage in such an effort. In fact, the FWCC has made clear that even it does not believe that adoption of a spectrum efficiency standard for satellite operations would be appropriate.[34]

As the Commission recognizes in the *Notice* (¶¶ 33-39), there are fundamental differences between terrestrial and satellite systems that do not allow the importation of a spectrum efficiency rule for terrestrial services into the regulation of satellite services. These differences are reflected in the separate FCC rule parts governing terrestrial and satellite services.

Satellite services, with the exception of DBS, are regulated under Part 25 of the Commission's rules. The efficiency of satellite systems is ensured in a myriad of ways under the current provisions of Part 25, as the Commission describes in detail in the *Notice* (¶ 39, n.71). The objective of these regulations is to ensure efficient use of the orbital resource and the spectrum. For instance, the Commission's long-standing two-degree spacing requirement for GSO FSS systems maximizes the efficient use of the spectrum and orbit resource. Two degree spacing

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[34] *See* Reply Comments of FWCC at 6 ("We understand that bits-per-Hertz standards for FSS would be unrealistic in view of long lead times and numerous other constraints on satellite system design, and we do not believe they are generally necessary for equitable sharing.").

allows the simultaneous operation of 40 GSO FSS systems from about 60° W.L. to 140° W.L., each capable of providing co-frequency, co-coverage service to the United States. In order to maximize the capacity of a given orbit location, FSS licensees are required to provide full frequency re-use.[35] The Commission's rules also specify stringent antenna sidelobe suppression requirements.[36] These requirements, as the Commission notes, facilitate sharing with terrestrial services by narrowing earth station antenna beamwidths and increasing off-axis side lobe suppression.

In contrast, the efficiency standards for terrestrial systems to which the FWCC and FCC (*Notice* at ¶ 59) refer are very different and require that a system provide a certain number of bits/sec per Hertz. There is no evidence that additional efficiency standards are needed to ensure the efficient operation of satellite systems. In fact, unlike the case for terrestrial systems, there are very real physical and practical limitations to the additional spectral efficiency that can be achieved in most satellite systems.[37] The satellite regulatory environment discussed above, coupled with these limitations and the sheer cost involved in constructing and launching a single satellite, much less a constellation of satellites within a system, results in the satellite operator needing to obtain the greatest capacity practicable over a given bandwidth for economic survival. This

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[35] Sections 25.210(d), (e), (f) & (g).

[36] Section 25.209.

[37] Most satellite systems use QPSK modulation, coupled with sophisticated spectral shaping to minimize the bandwidth requirements for a given digital transmission rate.

environment clearly precludes any conceivable need for the application of efficiency standards, as suggested in the *Notice*.

III. THE PROPOSED CHANGES IN INTERFERENCE COORDINATION PROCEDURES ARE UNNECESSARY AND UNDULY REGULATORY

The *Notice* also proposes changes in the procedures for coordination of satellite and terrestrial facilities in shared spectrum. Specifically, the *Notice* suggests that in certain circumstances, the analysis and outcome of one coordination should affect future coordinations involving the same or different parties. These new rules are unnecessary and would be impractical to implement. Therefore, the Commission should reject them.

A. The Commission Should Not Impose Requirements Regarding Interference Models

First, the *Notice* proposes to adopt a requirement regarding the use of coordination models. Under this proposal, if an earth station operator accepts a model reflecting certain interference mitigation techniques in order to coordinate its station initially, it would later be required to accept the same model for a subsequent coordination to the extent the same conditions exist. *See Notice* at ¶ 78. For example, if an earth station operator agrees that a building would block otherwise harmful interference, it must later assume the same degree of blockage in later coordinations involving similar paths.

There is no basis for imposing this requirement. First, as discussed above, the FWCC has provided absolutely no evidence of a need for this new rule. The FWCC's justification for this proposal is that "like cases should be treated

alike." *See id.* at ¶ 72. But there is simply no record demonstrating that operators of either terrestrial or satellite facilities are routinely treating similar cases differently. To the contrary, the Coalition believes based on the experience of its members that in virtually all cases, both types of licensees use sound engineering principles and apply those principles consistently.

Thus, in some instances an earth station operator needs to demonstrate that a building or other terrain feature will provide signal blockage in order to coordinate a new or modified facility with a potentially affected terrestrial operator. One would expect that the blockage would also be recognized in future coordinations between those parties, and generally this is the case. The same is true, in our experience, when the situations are reversed, and a terrestrial operator has done the initial analysis to facilitate siting of its link. Any rational operator recognizes that when facilities are located close to each other in shared spectrum, coordination may not be a one-time event, but may involve a series of issues with compromises likely to be required on both sides. As a result, there are incentives on both sides to deal equitably and reasonably with neighboring users.

However, even when a coordination involves the same two parties at the same locations, there are other factors that may justify a change in result from one coordination to the next. As the *Notice* recognizes, "[e]very coordination request is likely to differ from earlier requests in some respects." *Notice* at ¶ 73. Thus, the potential for harmful interference will depend on a wide range of factors that may vary from case to case, even when the same two facilities are involved. These

factors include the power level and modulation of the wanted and interfering signals, the distance between the structure or obstacle and the transmitting station and their relative heights, the antenna patterns involved, and others. As a result, acceptance of a particular model regarding terrain blockage will not in and of itself determine the outcome of future coordinations between the parties.

Of course, when different parties and different facilities are involved in the subsequent coordination, the probability of a different outcome is much greater. Even a small distance between the facilities at issue in the first coordination and the subsequent coordination can create a significant change in the impact of any terrain blockage. In fact, because a blockage analysis is path-specific, a calculation done for one coordination may not provide any useful information regarding a subsequent coordination if the sites involved are not exactly the same.

The language of the proposed rule does not adequately reflect these problems. Instead, the rule states simply that if an earth station licensee accepts a particular interference model relying on terrain or building blockage at its initial coordination, it must accept the use of the same model in subsequent coordinations. *Notice* at Appendix C, proposed § 25.203(e)(2). In contrast, in discussing the proposal in the text of the *Notice*, the Commission makes clear that the requirement to accept the same coordination model applies "only to the extent that [the] same conditions exist for subsequent requests for coordination." *Id.* at ¶ 78. This qualifying language is inexplicably absent from the text of the proposed rule.